By Electronic Submission

October 14, 2004

Mr. Stephen R. Kratzke
Associate Administrator for Rulemaking
National Highway Traffic Safety Administration
400 Seventh Street, SW
Washington, DC 20590

Re: Docket No. 17694;
RIN 2127-AJ10;
Comments on National Highway Traffic Safety Administration's (NHTSA) Side Impact Protection Proposed Rule; FR Vol. 69, No. 95, May 17, 2004

Dear Mr. Kratze:

Ferrari SpA (referred to as "Ferrari" hereafter) appreciates this opportunity to comment on the agency's proposed rule to upgrade FMVSS 214 – Side Impact Protection. At the start, Ferrari notes that it can provide only limited, preliminary comments on the proposal at this time, because the test dummies identified by NHTSA for the proposal have not been made available in sufficient quantities for manufacturer evaluation of the proposed revisions to FMVSS 214. Ferrari is providing these comments today based on the information available in the proposed rule and its accompanying analyses, and may need to supplement these comments as further information becomes available.

1. **MDB proposal: Ferrari supports the use of the ES-2 dummy, or its modified version ES-2re, in the MDB dynamic side impact of FMVSS 214, in place of the SID dummy currently used.**

Ferrari supports this change as a step forward in occupant protection in side crashes, given the much higher biofidelity of ES- 2 and ES-2re dummies, over the SID dummy currently used.

Ferrari believes the ability of ES-2 and ES-2re to recognize abdominal injuries, an ability that is completely lacking in the SID dummy currently used, will provide the opportunity for improved vehicle design and for the eventual reduction of abdominal injuries in the field for occupants of various sizes.

Based on internal testing and on the review of data published by NHTSA to support this rulemaking, Ferrari further believes the adoption of the new dummy, even with the proposed injury limits, poses significantly more stringent requirements on the reduction of thoracic injuries than the previous SID TTI limit.

Ferrari requests, however, that NHTSA reconsider its proposal to adopt the Es-2re with "rib extension" rather than the current version ES-2 without such modification. The current version of ES-2 already presents improved biofidelity and improved injury detection abilities over the SID, and ES-2 is a well known and widely available dummy worldwide. As noted above, the ES-2re has not been available for evaluation. A further step forward in biofidelity in side impact dummies is currently being pursued via the development of the World SID dummy. The adoption of the modified version ES-2re would be an intermediate step which might pose significant economic burdens on some test laboratories without commensurate benefits. In any event, however, Ferrari supports the adoption of either the ES-2 or the ES2re as a replacement for SID, and Ferrari commends NHTSA for this effort.

Lastly, Ferrari hopes that NHTSA will continue this path towards harmonization and better occupant protection in the future, by assessing the possibility to further upgrade the impact dummy for the MDB test from the ES-2 to the World SID dummy. It is Ferrari's understanding that NHTSA's VRTC now possesses two World SID dummies, so the agency can now begin to make progress toward considering the adoption of the World SID dummy.

2. MDB proposal: Ferrari does <u>not</u> support the use of SID-2s dummies in the MDB dynamic side impact of FMVSS 214, either in place of the SID dummy currently used, or in addition to the ES-2.

Ferrari has not been able to clearly identify in the Preliminary Economic Assessment the expected benefits from the introduction of the SID-2s in the MDB test. Based on the NPRM discussion, it is our understanding that NHTSA expects smaller occupants to be at greater risk of abdominal injuries and head injuries than the fiftieth percentile and larger occupants.

The reasoning behind this conclusion is not clear to us. Based on table V-7 of the Preliminary Economic Assessment, fatalities and MAIS4+ injuries for the population represented by fifth percentile dummies are about <u>half</u> those reported by the population represented by fiftieth percentile dummies in car-to-car crashes (crashes represented by the MDB dynamic test). Based on this table, therefore, it would seem to us that the fifth percentile population is at significantly <u>less</u> risk than the fiftieth percentile or larger population in car-to-car crashes, and that improvements for occupant protection in car-to-car crashes should focus on fiftieth percentile or larger occupants.

Moreover, even if the population represented by the fifth percentile dummy were really at a greater risk of head injuries and abdominal injuries in side impacts, the

introduction of the SID-2s would not provide any increased benefit to this population, since the SID2s dummy does not have any feature able to measure abdominal injuries, and the risk of injuries to the head is much better assessed by the pole impact test (not the MDB test). The introduction of the SID-2s, lacking even a chest deflection criterion, would not supplement in any way the protection provided by the introduction of the ES-2 or ES-2re.

The MDB tests performed by the agency support this conclusion. In fact (see table VIII-1, chapter VIII), MDB tests performed with ES-2re dummies on vehicles certified to comply with the current 214 MDB showed that for the front seat occupants both tested vehicles failed the more stringent chest injury limit proposed by NHTSA (35 mm), and one of the tested vehicles failed even the less stringent chest injury limit proposed by NHTSA (44 mm). The ES-2re dummy was able to identify a high risk of abdominal injuries for the rear occupants in one of the 2 tested vehicles. MDB tests performed by the agency with the SID-2s did not identify any specific risk of head injuries (which are better detected in a pole test), nor any specific risk of abdominal or thoracic injuries which had not already been identified by the ES-2re.

Therefore Ferrari recommends that NHTSA delete the proposed introduction of SID-2s in the MDB test, as being excessively burdensome and not justified as providing increased protection.

3. MDB proposal: Ferrari supports the use of a phase-in for the introduction of changes to the MDB dynamic side impact of FMVSS 214.

By focusing on the pole-test cost/benefit assessment, NHTSA has greatly underestimated the efforts needed to fulfill the proposed MDB test mode and injury criteria, and has similarly underestimated the burden and difficulties that the proposal will pose to OEMs, especially to Small Volume Manufacturers ("SVMs").

The MDB tests performed by NHTSA already show that an improvement in protection is needed for all tested vehicles to fulfill the proposed injury criteria with an 80% margin. Internal testing performed by Ferrari supports this finding. Improved chest protection would be needed even by vehicles whose armrest is already designed to reduce the risk of abdominal injuries, and changes would also be needed to vehicles that provide good to optimum chest protection when tested according to SINCAP or EuroNCAP. A vehicle expected to score 5 stars in the SINCAP crash test could well exceed 80% of the proposed injury limits in the 214 MDB test with ES-2re.

To fulfill the new MDB requirements, OEMs will have to introduce side bags, which would require seat structure modification, and/or extensively redesign door, door latch and locking mechanisms, and side structures in order to improve the vehicle strength.

Based on Ferrari experience the above types of modifications (side bag introduction and seat structure modification and/or side structure and door modification) will require

extensive re-testing, including all FMVSS 208 test cases and FMVSS 301 tests to validate door and door latch and locking mechanism behavior, and/or seat back behavior.

In Ferrari's opinion, the modified MDB test in fact requires the same or greater amount of redesign as the pole test, which requires the introduction of a head curtain**.**

Ferrari therefore requests that NHTSA reconsider its proposal not to introduce a phase-in for the new MDB test modes, and urges NHTSA to introduce for the MDB tests the same phase-in requirements which are being proposed for the pole test.

4. MDB proposal: Ferrari supports the adoption of MDB injury criteria consistent with international harmonization.

Ferrari commends NHTSA for its efforts in moving toward a harmonized dummy for Side Impact Protection assessment, and hopes NHTSA will further pursue international harmonization by adopting injury criteria and injury limits which are consistent with international harmonization, unless there are clear and strong field data showing the need for different criteria.

Ferrari has not been able to identify any such data in the NPRM or in the Preliminary Economic Assessment for this rule, and therefore recommends that NHTSA adopts the following criteria:

HIC@36 ms	<	1000
Chest deflection	<	42 mm
Abdominal force	<	2500 N
Pelvic force	<	6000 N

Ferrari does not support the introduction of a lower spine acceleration limit.
It has not been possible for us to locate in the NPRM the proposed filtering class for the lower spine acceleration, and we kindly requests NHTSA to include this data in the FMVSS214 Final Rule if the lower spine acceleration criterion will be adopted.

5. Pole test proposal: Ferrari supports the addition of a pole test consistent with international harmonization to FMVSS 214, i.e. an 18 mph 90° pole test using ES-2 or ES-2re dummy

Ferrari believes that, the introduction of a side impact pole test with head injury criterion could provide an improvement in occupant protection. Ferrari therefore supports the idea of such a pole test <u>if</u> international harmonization of the test, the barrier and dummy is guaranteed. Ferrari believes that this is the only way – particularly for small volume manufacturers (SVMs) – that such a test can meet the "reasonable and practicable" requirement imposed by 49 USC 30111(b)(3).

We therefore recommend that NHTSA adopts a pole test consistent with the Euro NCAP side pole impact test, i.e. an 18 mph 90° pole test, with ES-2, or ES-2re dummy.

We do not support NHTSA proposal to increase the pole test speed from 18 to 20 mph for the following reasons:

1) it would be excessively burdensome, forcing OEM to redesign side structures and head protection side bag

2) it would force an increase in the power of the head protection side bag with unknown consequencesfor the possibility of increased injury risk for occupants that are out of position and children.

We do not support NHTSA's proposal to change the pole angle from 90° to 75°. We do not support the introduction of a SID-IIs dummy in the proposed pole test. It is our understanding from the Preliminary Economic Assessment and the NPRM that such proposals are targeted at providing improved sensing performance and an enlarged side bag for head protection.

Ferrari does not believe that robust sensing performance will be guaranteed in the system by any specific test. Sensing performance improvements are continuously sought and desired by all OEM's, taking into account a much wider set of conditions than the mandated crash tests. A decision to establish a specific crash test (or tests) in a Federal Safety Standard for the purpose of evaluating sensor performance will focus development efforts only onto those specific conditions, giving them more importance over other conditions, but not necessarily resulting in the desired sensor performance.

The change in the pole angle, or even the combined request for a 90° and an oblique pole, will therefore force manufacturers to focus the ability of the algorithm to distinguish among different crashes and misuse conditions in the specific mandated tests, and might force manufacturers to delete other sensing tests which they have developed as the specific worst case for their specific types of vehicles, since development time and resources are not endless.

In the same way, robustness of air bag performance for many different types of events and occupants is sought by the manufacturers and balanced against the risk of injury to out of position occupants, as well as the risk of air bag malfunction. Adding a 75° pole test, or even adding a SID-IIs test would not enlarge the considered conditions, but only force the manufacturers to focus their efforts on these conditions, detrimental to other ones (e.g. occupants that are out of position, larger percentile protection …).

We have not been able to locate in the PEA any evaluation of the potential detrimental effects of the proposal, other than a generic statement that side air bag can pose a risk of injury to out of position occupants. We believe a more thorough assessment of the possible adverse consequences of these proposed changes is needed prior to mandate an oblique pole or a SID-IIs pole test.

6. Pole test proposal: Ferrari supports the introduction of a pole test with Head Injury Criterion to FMVSS 214. Ferrari does not support the introduction of a pole test with chest injury criterion or other injury criteria to FMVSS 214.

Head injuries are clearly the main cause for MAIS 4+ injuries and the main cause for fatalities in vehicle-to-pole crashes, for all occupant sizes (see PEA Table V-6), whereas thorax injuries are the main cause for fatalities and MAIS4+ injuries in vehicle-to vehicle tests (such as the MDB test represents).

Ferrari believes that the introduction of a pole test **with** Head Injury Criterion and **without** chest injury criterion or abdomen or pelvis injury criteria will allow manufacturers to focus on providing effective active head injury protection in pole crashes.

NHTSA estimates that curtain air bags will be the most effective type of bags in providing head protection in side impacts for all occupants. Ferrari supports NHTSA's efforts to mandate the introduction of side bags providing head protection in the whole fleet. However, curtain air bags will not provide any thorax protection. Based on NHTSA's own data, combined head/torso air bags are the only type of side air bags that have been able to offer some protection to the thorax in the pole tests performed by the agency. NHTSA's tests with ES-2re showed that in 12 cases out of 17, existing side air bags proved not to be able to adequately protect the occupant when the thorax criterion is taken into account. The adoption of the proposed pole test thorax criterion would therefore force manufacturers to strongly focus their efforts on the development of a yet unknown countermeasure to allow them to meet the pole test thorax criterion, driving resources and attention away from providing robustness and reliability for head protection in the real world.

Ferrari urges NHTSA to consider the risk that the introduction of a pole test with thorax injury criterion would drive manufacturers away from the curtain technology and towards "combined" side bag technology. The "combined" technology has inherent limitations (e.g., long deployment times, potentially high aggressiveness to out-of-position occupants) which might result in lower benefits in the real world than those which would be achievable with the introduction of a curtain air bag.

What's worse, in the PEA NHTSA states that there is a known risk of injuries to out-of-position occupants from existing side air bags. Currently, manufacturers are voluntarily trying to assess and minimize risks to occupants that are out-of-position. The adoption of a chest injury criterion in an FMVSS 214 pole test will compel the use of side air bags which are more aggressive than the existing ones, and which might not able to be developed to meet out-of-position requirements.

Ferrari urges NHTSA to assess the risk to out-of-position occupants for the type of side bags that would be needed to satisfy the chest injury criterion in a pole test before mandating such a side air bag in the USA fleet.

NHTSA should take into account the previous experiences with the adverse effects of over-powerful front air bags, before mandating a new air bag technology with unknown effects

7. Pole test proposal: Lead-time and request for additional exemptions

A. Exemption from the static test

The purpose of the static door crush resistance test in the existing FMVSS 214 is to guarantee the ability of the vehicle to provide some kind of protection in a side impact against a narrow object. With the adoption of a pole test, the same performance could be assessed in the pole test (maybe with the addition of a structural performance parameter to the test, e.g. maximum pole intrusion), making the door crush resistance test redundant and unnecessarily burdensome.

Ferrari requests that if the vehicle-to-pole test is adopted, any vehicle certified to the vehicle-to-pole test should be exempted from the static test in FMVSS 214 (on the basis that the static test would be repetitive).

B. Exemption from the vehicle-to-pole test

Under 49 CFR 571.214 S3(e)(1), a vehicle would be exempt from the static test requirements if its side door is located so that H-point of a manikin placed in any seat is below the sill of the vehicle and thus does not fall "within the transverse, horizontal projection of the door's opening". Ferrari maintains that if a vehicle is exempt under current S3(e) it should likewise be exempt from the proposed pole test.

C. Small volume manufacturers need greater lead-time

Ferrari supports the proposal to permit SVMs until the end of the vehicle-to-pole test phase-in before having to comply, and also supports the proposal as regards additional pole test lead-time for limited line manufacturers.

8. Preliminary Economic Assessment: request for revision

It is Ferrari's opinion that the Preliminary Economic Assessment of the FMVSS214 NPRM did not fully assess the impact of the mandated requirements.

Ferrari believes that the PEA should be revised to assess the following points:

1) R&D costs and structure development costs
2) Elongation of model development cycle needed to address the new FMVSS214 requirements
3) Extra weight per vehicle and impact on fuel economy
4) Potential negative effects of the mandated new technology, especially increase in the injury risk for out-of-position occupants and children.

Ferrari will submit separately a document providing internal estimates (with confidential information) for the above points. Meanwhile the non-confidential version of such document is herewith enclosed.

"FMVSS214 - Ferrari comments - attachme

9. **Impact on small business**

Ferrari does not share NHTSA belief that the rule will not have an impact on small entities because there is not a significant number of Small Volume Manufacturers.

Ferrari can name the following Small Vehicles Manufacturers:

Ferrari, Maserati, Lamborghini, Lotus, Bentley, Rolls Royce, Aston Martin. Panoz, Saleen, Mosler, Morgan, Bugatti, London Taxi.

Ferrari asks NHTSA to revise the impact of the regulation on small business taking into account small volume manufacturers.

10. Cumulative effect of FMVSS208, FMVSS301, FMVSS208

Ferrari also asks NHTSA to consider the cumulative effects on Small Vehicle Manufacturers of all of the recently adopted and proposed changes to dynamic crashworthiness standards.

The amount of extra testing and extra development that has been mandated in the last four years is nearing the point at which it will no longer be possible for Small Vehicle Manufacturers to meet the burdens required to stay in the United States' market.

11. Conclusions

Based on the above, Ferrari SpA draws the following conclusions:

1. **MDB proposal: Ferrari supports the use of ES-2 dummy, or its modified version ES-2re, in the MDB dynamic side impact of FMVSS 214, in place of the SID dummy currently used.**

2. **MDB proposal: Ferrari does <u>not</u> support the use of SID-2s in the MDB dynamic side impact of FMVSS 214, neither in place of the SID dummy currently used, nor in addition to the ES-2.**

3. **MDB proposal: Ferrari supports a phase-in for the introduction of an MDB dynamic side impact test in FMVSS 214.**

4. **MDB proposal: Ferrari supports the adoption of MDB injury criteria consistent with international harmonization.**

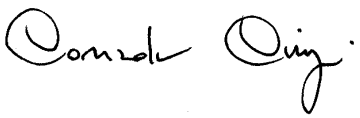
5. **Pole test proposal: Ferrari supports the addition of a pole test to FMVSS 214 <u>if</u> based on international harmonization: 18 mph 90° pole test using ES-2 or ES-2re dummy**

6. **Pole test proposal: Ferrari does not support the addition of the SID-IIs to the pole test requirements in FMVSS 214.**

7. **Pole test proposal: the addition of a pole test to FMVSS 214 is a good idea only if the standard is reasonable, practicable and appropriate for particular types of motor vehicles. This means:**
   - NHTSA should consider the cumulative effect of its regulation
   - NHTSA should reconsider the underestimated costs predicted in its proposal; should reconsider its proposal in light of the fact that certain vehicles, like sports performance cars, have basic features and characteristics that make the <u>structural</u> changes necessitated by the proposal difficult if not impossible, irrespective of lead-time; and
   - NHTSA should consider and estimate in its proposal the practicability and potential adverse consequences of the technology required by the proposal.

8. **Pole test proposal: Ferrari supports the introduction of a pole test with Head Injury Criterion to FMVSS 214. Ferrari does <u>not</u> support the introduction of a pole test with chest injury criterion or other injury criteria to FMVSS 214.**
9. **Pole test proposal: Lead-time and request for additional exemptions: NHTSA should provide an exemption under S5 from the vehicle-to-pole test if a vehicle would be exempt under current S3(e); and, if the pole test is adopted, the <u>static</u> test should be deleted as redundant.**

Respectfully submitted,



Corrado Cingi

Vehicle Certification Manager

Ferrari S.p.A.